UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,118	03/10/2004	Shigekazu Harada	00380377AA	2471

30743 7590 08/17/2009
WHITHAM, CURTIS & CHRISTOFFERSON & COOK, P.C.
11491 SUNSET HILLS ROAD
SUITE 340
RESTON, VA 20190

EXAMINER	
LIU, LI	
ART UNIT	**PAPER NUMBER**
2613	
MAIL DATE	**DELIVERY MODE**
08/17/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/796,118	HARADA, SHIGEKAZU	
	Examiner	Art Unit	
	LI LIU	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,13,20 and 22-36* is/are pending in the application.

4a) Of the above claim(s) *28-36* is/are withdrawn from consideration.

5)☒ Claim(s) *20* is/are allowed.

6)☒ Claim(s) *1,13 and 22-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/8/2008*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Species 1 in the reply filed on 5/22/2009 is acknowledged. Claims 28-36 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species 2, there being no allowable generic or linking claim.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 9/8/2008 is being considered by the examiner.

Response to Arguments

3. Applicant's arguments with respect to claims 1, 13 and 22-27 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 13 and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant admitted prior art (AAPA: Figure 1 and the Background

of the Invention) in view of Majima (US 6,101,014) and Nakamura et al (US 5,212,577) and Smith et al (US 2003/0020977).

1). With regard to claim 1, the AAPA discloses a wavelength division multiplexing transmission system (Figure 1) in which a plurality of remote apparatuses (20-1 to 20-m in Figure 1) are connected to a station apparatus (10 in Figure 1) which communicates with the remote apparatuses using a given plurality of wavelengths (Background of the Invention: the system is a wavelength multiplexing transmission system, each ONU transmits and receives different wavelength), wherein each of the remote apparatuses comprises:

a wavelength separating device (e.g., the wavelength demultiplexer 7 in Figure 1 of AAPA) which separates a wavelength from the given plurality of wavelengths;

a signal output device (the optical receiver 220-1 to 220-m in Figure 1) which outputs a reception status signal (the receiver receives the selected signal and outputs a reception status signal, based on the status signal, the maintainer/personnel sets the wavelength control means to output a specific wavelength, page 2 line 10 to page 3 line 11); and

a wavelength control device (the wavelength controller 240-1 to 240-n which controls the wavelengths of optical signals to be transmitted from the optical transmitter 230-1 to 230-n, page 3, line 8-11).

The AAPA teaches that the optical transmitter 230-m of the **newly added** remote apparatus 20-m contains a wavelength tunable laser. The output wavelength of the wavelength tunable laser must be **controlled** so as to be the wavelength assigned to

the remote apparatus 20-m **through the use of a wavelength controller** (page 3, line 8-11). But, in FIG. 1, each time a new remote apparatus is installed, a wavelength to be used in that system must be set by a maintainer or other personnel.

The AAPA does not expressly teach: a wavelength separating device which separates, according to a wavelength control signal, a wavelength from the given plurality of wavelengths; a reception status signal indicating whether or not a separated wavelength is received from the wavelength separating device; and a wavelength control device which generates the wavelength control signal to the wavelength separating devices and receives the reception status signal to determine whether a signal corresponding to the separated wavelength is being received, and, if not, sets the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device to separate a different wavelength from the given plurality of wavelengths until the wavelength control device determines that no signal corresponding to the separated wavelength is being received.

However, Majima, in the same field of endeavor, teaches a system and method (Figure 4 and Figure 5) in which a wavelength separating device (e.g., the optical filter 503 in Figure 5) which separates, according to a wavelength control signal (e.g., the signal from the wavelength control system 501 via the tunable optical filter driver circuit 505 in Figure 5), a wavelength from the given plurality of wavelengths; a reception status signal indicating whether or not a separated wavelength is received from the

wavelength separating device (Majima discloses that each sending terminal station performs sweeping to detect any transmission wavelength of another station which may exist on the transmission line, column 9, line 49-54; and FIG. 2A shows two continuous wavelength tunable ranges available on the tunable LD 502. Solid vertical lines show the **used wavelengths**, while broken vertical lines show the **candidate wavelengths or available wavelength**. Majima teaches that the discriminator 508 produces a signal H (digital signal "1") when the level of the input signal is not smaller than the threshold value, otherwise it produces a signal L (digital signal "0")); and a wavelength control device (e.g., the wavelength control system 501) which generates the wavelength control signal to the wavelength separating devices (e.g., the control signal "Tunable Optical Filter Control Voltage" is generated by the wavelength control system, and sent to the wavelength separating device "Tunable Optical Filter" 503) and receives the reception status signal to determine whether a signal corresponding to the separated wavelength is being received (the wavelength control system 501 receives the reception status signal from the Discriminator 508) to determine whether a signal corresponding to the separated wavelength is being received, and then finding the candidate wavelength and then setting the remote transmitter to transmit an optical signal with the available wavelength determined by said wavelength control device (the wavelength control system 501 controls the tunable LD driver circuit 504 based on a signal outputted from the discriminator 508, thereby performing the control of the wavelength, column 6, line 54-57).

Majima teaches that the transmitting terminal station controls the wavelength tunable optical transmitter such that the transmitter transmits light of a wavelength which is not being used on the network communication transmission line. Majima's method also can be carried out such that the delivery of the output light from the light-emitting means to the transmitting line is prohibited until the wavelength of the output light is set not to interfere with the other light. Thus, the delivery of the output light is controlled to avoid any interference which otherwise may be caused by delivering light of a wavelength which risks interference (column 4, line 30-47). Ref to Figures 1 and 2, wavelengths indicated by broken vertical lines are located as the candidates of the transmission wavelength to be set.

Majima teaches to find the available wavelength. But, in Majima's system, the candidate wavelengths or available wavelength is selected at the end (either shortest wavelength side or longest wavelength side) of the existing wavelengths (Figures 1 and 2). Majima does not expressly disclose that the available wavelength is the unused wavelength which can be any unused wavelength in the transmission system; Majima also does not expressly disclose that during the sweep, if the unused wavelength is found, stops the sweep and sets the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device to separate a different wavelength from the given plurality of wavelengths until the wavelength control device determines that no signal corresponding to the separated wavelength is being received.

Another prior art, Nakamura et al, also teaches a system and method which provides a specific signal detection means finding out a communication available wavelength not in use from an available wavelength region at desired transmission and detecting a communication destination specific signal when a communication request is detected. Nakamura et al discloses a wavelength separating device (e.g., 55 in Figure 2) which separates, according to a wavelength control signal (the "Transmission Wavelength Control" in Figure 2), a wavelength from the given plurality of wavelengths; a signal output device means (the photodiode 54 in Figure 2) which outputs a reception status signal indicating whether or not a separated wavelength is received from the wavelength separating device (column 6, line 43 to column 7 line 27, and column 8 lien 49-54); and a wavelength control device (the control circuit 51, 112, 605 etc in Figures 2, 5, 7 and 8) which generates the wavelength control signal to the wavelength separating devices and receives the reception status signal to determine whether a signal corresponding to the separated wavelength is being received (Figures 3 and 9-11, and column 6, line 43 to column 7 line 27, and column 8 lien 49-54, and column 11 line 19 to 51 etc) and selecting an unused wavelength for transmission of signal (e.g., the first wavelength $\lambda 1$ is selected from the unused wavelength, column 6, line 49-59). In Nakamura's system, the unused wavelengths (e.g., $\lambda 1$ and $\lambda 2$ in Figure 3) can be anywhere within the available wavelength range (λA to λB).

As disclosed by the AAPA, for a conventional system, each time a new remote apparatus is installed, a wavelength to be used in that system must be set by a

maintainer or other personnel. And collisions between signals may occur and action must be taken to handle them.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the method and system of autonomously controlling and setting of an available wavelength or unused wavelength as taught by Majima and Nakamura et al to the system of the applicant admitted prior art so that the controller can get the reception status information from the receiver, and then desired wavelength for reception and transmitting can be easily and automatically selected based on the received information, and then no man-hours are required while a new remote apparatus is added or updated.

Nakamura et al teaches that the first wavelength $\lambda 1$ can be selected for transmission. But, Nakamura et al does not expressly disclose that the sweep is stop once the first unused wavelength is found.

Another prior art, Smith, teaches a scheme to find the available wavelength (e.g., Figure 8A), during the steps of searching (e.g., the loop 93->94->95->96->93 shown in Figure 8A), once the available wavelength is found (step 94), the searching is stop, and the path is set; if the available wavelength is not found (step 94), the system will generate a new control signal to search again (e.g., “flag regen path” and “next regen path” in Figure 8A) until the system determines that the available wavelength is found.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the scheme of wavelength searching as taught by Smith to the system of the AAPA and Majima and Nakamura et al so that once the

unused wavelength is found, the searching is stopped and then setting the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device to separate a different wavelength from the given plurality of wavelengths until the wavelength control device determines that no signal corresponding to the separated wavelength is being received. The suggestion/motivation for doing so would have been to further reduce the processing time while adding the new apparatus since once the first unused wavelength is found the system uses this wavelength for communication and the sweeping of all wavelength range is not required.

2). With regard to claim 13, the AAPA discloses a remote apparatus (20-1 to 20-m in Figure 1) in a wavelength division multiplexing transmission system (Figure 1) in which a plurality of remote apparatuses (20-1 to 20-m in Figure 1) are connected to a station apparatus (10 in Figure 1) which communicates with the remote apparatuses using a given plurality of wavelengths (Background of the Invention: the system is a wavelength multiplexing transmission system, each ONU transmits and receives different wavelength), the remote apparatuses comprises:

a wavelength separating device (e.g., the wavelength demultiplexer 7 in Figure 1 of AAPA) which separates a wavelength from the given plurality of wavelengths;

a signal output device (the optical receiver 220-1 to 220-m in Figure 1) which outputs a reception status signal (the receiver receives the selected signal and outputs a reception status signal, based on the status signal, the maintainer/personnel sets the

wavelength control means to output a specific wavelength, page 2 line 10 to page 3 line 11); and

a wavelength control device (the wavelength controller 240-1 to 240-n which controls the wavelengths of optical signals to be transmitted from the optical transmitter 230-1 to 230-n, page 3, line 8-11).

The AAPA teaches that the optical transmitter 230-m of the **newly added** remote apparatus 20-m contains a wavelength tunable laser. The output wavelength of the wavelength tunable laser must be **controlled** so as to be the wavelength assigned to the remote apparatus 20-m **through the use of a wavelength controller** (page 3, line 8-11). But, in FIG. 1, each time a new remote apparatus is installed, a wavelength to be used in that system must be set by a maintainer or other personnel.

The AAPA does not expressly teach: a wavelength separating device which separates, according to a wavelength control signal, a wavelength from the given plurality of wavelengths; a reception status signal indicating whether or not a separated wavelength is received from the wavelength separating device; and a wavelength control device which generates the wavelength control signal to the wavelength separating devices and receives the reception status signal to determine whether a signal corresponding to the separated wavelength is being received, and, if not, sets the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device to separate a different wavelength from the given plurality of wavelengths until

the wavelength control device determines that no signal corresponding to the separated wavelength is being received.

However, Majima, in the same field of endeavor, teaches a system and method (Figure 4 and Figure 5) in which a wavelength separating device (e.g., the optical filter 503 in Figure 5) which separates, according to a wavelength control signal (e.g., the signal from the wavelength control system 501 via the tunable optical filter driver circuit 505 in Figure 5), a wavelength from the given plurality of wavelengths; a reception status signal indicating whether or not a separated wavelength is received from the wavelength separating device (Majima discloses that each sending terminal station performs sweeping to detect any transmission wavelength of another station which may exist on the transmission line, column 9, line 49-54; and FIG. 2A shows two continuous wavelength tunable ranges available on the tunable LD 502. Solid vertical lines show the **used wavelengths**, while broken vertical lines show the **candidate wavelengths or available wavelength**. Majima teaches that the discriminator 508 produces a signal H (digital signal "1") when the level of the input signal is not smaller than the threshold value, otherwise it produces a signal L (digital signal "0")); and a wavelength control device (e.g., the wavelength control system 501) which generates the wavelength control signal to the wavelength separating devices (e.g., the control signal “Tunable Optical Filter Control Voltage” is generated by the wavelength control system, and sent to the wavelength separating device ”Tunable Optical Filter” 503) and receives the reception status signal to determine whether a signal corresponding to the separated wavelength is being received (the wavelength control system 501 receives the reception

status signal from the Discriminator 508) to determine whether a signal corresponding to the separated wavelength is being received, and then finding the candidate wavelength and then setting the remote transmitter to transmit an optical signal with the available wavelength determined by said wavelength control device (the wavelength control system 501 controls the tunable LD driver circuit 504 based on a signal outputted from the discriminator 508, thereby performing the control of the wavelength, column 6, line 54-57).

Majima teaches that the transmitting terminal station controls the wavelength tunable optical transmitter such that the transmitter transmits light of a wavelength which is not being used on the network communication transmission line. Majima's method also can be carried out such that the delivery of the output light from the light-emitting means to the transmitting line is prohibited until the wavelength of the output light is set not to interfere with the other light. Thus, the delivery of the output light is controlled to avoid any interference which otherwise may be caused by delivering light of a wavelength which risks interference (column 4, line 30-47). Ref to Figures 1 and 2, wavelengths indicated by broken vertical lines are located as the candidates of the transmission wavelength to be set.

Majima teaches to find the available wavelength. But, in Majima's system, the candidate wavelengths or available wavelength is selected at the end (either shortest wavelength side or longest wavelength side) of the existing wavelengths (Figures 1 and 2). Majima does not expressly disclose that the available wavelength is the unused wavelength which can be any unused wavelength in the transmission system; Majima

also does not expressly disclose that during the sweep, if the unused wavelength is found, stops the sweep and sets the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device to separate a different wavelength from the given plurality of wavelengths until the wavelength control device determines that no signal corresponding to the separated wavelength is being received.

Another prior art, Nakamura et al, also teaches a system and method which provides a specific signal detection means finding out a communication available wavelength not in use from an available wavelength region at desired transmission and detecting a communication destination specific signal when a communication request is detected. Nakamura et al discloses a wavelength separating device (e.g., 55 in Figure 2) which separates, according to a wavelength control signal (the "Transmission Wavelength Control" in Figure 2), a wavelength from the given plurality of wavelengths; a signal output device means (the photodiode 54 in Figure 2) which outputs a reception status signal indicating whether or not a separated wavelength is received from the wavelength separating device (column 6, line 43 to column 7 line 27, and column 8 lien 49-54); and a wavelength control device (the control circuit 51, 112, 605 etc in Figures 2, 5, 7 and 8) which generates the wavelength control signal to the wavelength separating devices and receives the reception status signal to determine whether a signal corresponding to the separated wavelength is being received (Figures 3 and 9-11, and column 6, line 43 to column 7 line 27, and column 8 lien 49-54, and column 11

line 19 to 51 etc) and selecting an unused wavelength for transmission of signal (e.g., the first wavelength λ1 is selected from the unused wavelength, column 6, line 49-59). In Nakamura's system, the unused wavelengths (e.g., λ1 and λ2 in Figure 3) can be anywhere within the available wavelength range (λA to λB).

As disclosed by the AAPA, for a conventional system, each time a new remote apparatus is installed, a wavelength to be used in that system must be set by a maintainer or other personnel. And collisions between signals may occur and action must be taken to handle them.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the method and system of autonomously controlling and setting of an available wavelength or unused wavelength as taught by Majima and Nakamura et al to the system of the applicant admitted prior art so that the controller can get the reception status information from the receiver, and then desired wavelength for reception and transmitting can be easily and automatically selected based on the received information, and then no man-hours are required while a new remote apparatus is added or updated.

Nakamura et al teaches that the first wavelength λ1 can be selected for transmission. But, Nakamura et al does not expressly disclose that the sweep is stop once the first unused wavelength is found.

Another prior art, Smith, teaches a scheme to find the available wavelength (e.g., Figure 8A), during the steps of searching (e.g., the loop 93->94->95->96->93 shown in Figure 8A), once the available wavelength is found (step 94), the searching is stop, and

the path is set; if the available wavelength is not found (step 94), the system will generate a new control signal to search again (e.g., “flag regen path” and “next regen path” in Figure 8A) until the system determines that the available wavelength is found. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the scheme of wavelength searching as taught by Smith to the system of the AAPA and Majima and Nakamura et al so that once the unused wavelength is found, the searching is stopped and then setting the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device to separate a different wavelength from the given plurality of wavelengths until the wavelength control device determines that no signal corresponding to the separated wavelength is being received. The suggestion/motivation for doing so would have been to further reduce the processing time while adding the new apparatus since once the first unused wavelength is found the system uses this wavelength for communication and the sweeping of all wavelength range is not required.

3). With regard to claim 22, the AAPA and Majima and Nakamura et al and Smith disclose all of the subject matter as applied to claim 1 above. And the combination of the AAPA and Majima and Nakamura et al and Smith further discloses wherein the station apparatus transmits signals to the plurality of remote apparatuses using only those wavelengths used by remote apparatuses currently connected to the station apparatus (e.g., the AAPA: page 2 line 10 to page 3 line 11, the station apparatus 10

transmits signals to the plurality of remote apparatuses, 20-1 to 20-n, using only those wavelengths, 1011 to 10n1, used by remote apparatuses currently connected to the station apparatus; that is, the station apparatus uses n wavelengths for the n remote apparatuses, and the 20-m is the newly added remote apparatus).

4). With regard to claims 23 and 25, the AAPA and Majima and Nakamura et al and Smith disclose all of the subject matter as applied to claims 1 and 13 above. And the combination of the AAPA and Majima and Nakamura et al and Smith further discloses wherein each remote apparatus further comprises:

a remote apparatus transmitter (e.g., AAPA: the optical transmitter 230-i; or Majima: the tunable LD in Figure 5) controlled by the wavelength control device (e.g., AAPA: the wavelength controller 240-i; or Majima: the wavelength control system 501 in Figure 5), the remote apparatus transmitter initially not outputting signals until the wavelength control device generates a control signal to the remote apparatus transmitter (e.g., AAPA: the optical transmitter 230-m initially not outputting signals until the wavelength control device 240-m generates a control signal to the remote apparatus transmitter; or Majima: the tunable LD initially not outputting signals until the wavelength control device 501 generates a control signal to the transmitter), the remote apparatus transmitter, in response to the control signal, outputting a signal at the wavelength to be used by the remote apparatus (e.g., AAPA: page 3 line 6-11, remote apparatus transmitter 230-m, in response to the control signal, outputting a signal at the wavelength to be used by the remote apparatus; or Majima: the tunable LD, in response

to the control signal, outputting a signal at the wavelength to be used by the remote apparatus).

5). With regard to claim 24, the AAPA and Majima and Nakamura et al and Smith disclose all of the subject matter as applied to claim 1 above. And the combination of the AAPA and Majima and Nakamura et al and Smith further discloses wherein communication between the station apparatus and the plurality of remote apparatuses is by optical signals (the combination of the AAPA and Majima and Nakamura et al and Smith teaches that the optical signals are communicated between the station apparatus and the remote apparatuses), connections between the station apparatus and the remote apparatuses being made by optical couplers in a star topology (e.g., the star coupler 420 in Figure 4 of Majima, and star coupler 32 in Figure 1 of Nakamura; that is the station apparatus and the remote apparatuses is connected by optical couplers in a star topology).

6). With regard to claim 26, the AAPA discloses a method (Figure 1 and the Background of the Invention) for setting a wavelength to be used by a remote apparatus in a wavelength division multiplexing transmission system (Figure 1) in which a plurality of remote apparatuses (20-1 to 20-m in Figure 1) are connected to a station apparatus (10 in Figure 1) and communication is performed among the remote apparatuses and the station apparatus using a given plurality of wavelengths (Background of the Invention: the system is a wavelength multiplexing transmission system, each ONU transmits and receives different wavelength), the method comprising:

separating a wavelength from one or more wavelengths of the given plurality of wavelengths transmitted by a transmitter of the station apparatus (e.g., the wavelength demultiplexer 7 in Figure 1 of AAPA separates a wavelength from the given plurality of wavelengths);

outputting a reception status signal indicating whether or not the separated wavelength is received (the optical receiver 220-1 to 220-m in Figure 1 receives the selected signal and outputs a reception status signal, based on the status signal, the maintainer/personnel sets the wavelength control means to output a specific wavelength, page 2 line 10 to page 3 line 11); and

controlling generation of a wavelength control signal (the wavelength controller 240-1 to 240-n which controls the wavelengths of optical signals to be transmitted from the optical transmitter 230-1 to 230-n, page 3, line 8-11).

The AAPA teaches that the optical transmitter 230-m of the **newly added** remote apparatus 20-m contains a wavelength tunable laser. The output wavelength of the wavelength tunable laser must be **controlled** so as to be the wavelength assigned to the remote apparatus 20-m **through the use of a wavelength controller** (page 3, line 8-11). But, in FIG. 1, each time a new remote apparatus is installed, a wavelength to be used in that system must be set by a maintainer or other personnel.

The AAPA does not expressly disclose: said step of separating being preformed according to a wavelength control signal; controlling generation of a wavelength control signal used in said separating step based on said reception status signal output in said outputting step, said controlling step determining whether a signal corresponding to the

separated wavelength is being received, and, if not, setting the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device at the remote apparatus to separate a different wavelength from the given plurality of wavelengths until it is determined that no signal corresponding to the separated wavelength is being received.

However, Majima, in the same field of endeavor, teaches a method (Figure 4 and Figure 5) in which a wavelength separating device (e.g., the optical filter 503 in Figure 5) which separates, according to a wavelength control signal (e.g., the signal from the wavelength control system 501 via the tunable optical filter driver circuit 505 in Figure 5), a wavelength from the given plurality of wavelengths; controlling generation of a wavelength control signal used in said separating step based on said reception status signal output in said outputting step (e.g., the wavelength control system 501 receives the reception status signal from the discrimination 508, and generates the wavelength control signal, and sends the wavelength control signal to the optical filter 503 via the tunable optical filter driver circuit 505 in Figure 5), said controlling step determining whether a signal corresponding to the separated wavelength is being received (the wavelength control system 501 receives the reception status signal from the Discriminator 508; Majima discloses that each sending terminal station performs sweeping to detect any transmission wavelength of another station which may exist on the transmission line, column 9, line 49-54; and FIG. 2A shows two continuous

wavelength tunable ranges available on the tunable LD 502. Solid vertical lines show the **used wavelengths**, while broken vertical lines show the **candidate wavelengths or available wavelength**. Majima teaches that the discriminator 508 produces a signal H (digital signal "1") when the level of the input signal is not smaller than the threshold value, otherwise it produces a signal L (digital signal "0")), and then finding the candidate wavelength and then setting the remote transmitter to transmit an optical signal with the available wavelength determined by said wavelength control device (the wavelength control system 501 controls the tunable LD driver circuit 504 based on a signal outputted from the discriminator 508, thereby performing the control of the wavelength, column 6, line 54-57).

Majima teaches that the transmitting terminal station controls the wavelength tunable optical transmitter such that the transmitter transmits light of a wavelength which is not being used on the network communication transmission line. Majima's method also can be carried out such that the delivery of the output light from the light-emitting means to the transmitting line is prohibited until the wavelength of the output light is set not to interfere with the other light. Thus, the delivery of the output light is controlled to avoid any interference which otherwise may be caused by delivering light of a wavelength which risks interference (column 4, line 30-47). Ref to Figures 1 and 2, wavelengths indicated by broken vertical lines are located as the candidates of the transmission wavelength to be set.

Majima teaches to find the available wavelength. But, in Majima's system, the candidate wavelengths or available wavelength is selected at the end (either shortest

wavelength side or longest wavelength side) of the existing wavelengths (Figures 1 and 2). Majima does not expressly disclose that the available wavelength is the unused wavelength which can be any unused wavelength in the transmission system; Majima also does not expressly disclose that during the sweep, if the unused wavelength is found, stops the sweep and sets the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device to separate a different wavelength from the given plurality of wavelengths until the wavelength control device determines that no signal corresponding to the separated wavelength is being received.

Another prior art, Nakamura et al, also teaches a system and method which provides a specific signal detection means finding out a communication available wavelength not in use from an available wavelength region at desired transmission and detecting a communication destination specific signal when a communication request is detected. Nakamura et al discloses a wavelength separating device (e.g., 55 in Figure 2) which separates, according to a wavelength control signal (the "Transmission Wavelength Control" in Figure 2), a wavelength from the given plurality of wavelengths; a signal output device means (the photodiode 54 in Figure 2) which outputs a reception status signal indicating whether or not a separated wavelength is received from the wavelength separating device (column 6, line 43 to column 7 line 27, and column 8 lien 49-54); and a wavelength control device (the control circuit 51, 112, 605 etc in Figures 2, 5, 7 and 8) which generates the wavelength control signal to the wavelength

separating devices and receives the reception status signal to determine whether a signal corresponding to the separated wavelength is being received (Figures 3 and 9-11, and column 6, line 43 to column 7 line 27, and column 8 lien 49-54, and column 11 line 19 to 51 etc) and selecting an unused wavelength for transmission of signal (e.g., the first wavelength λ1 is selected from the unused wavelength, column 6, line 49-59). In Nakamura's system, the unused wavelengths (e.g., λ1 and λ2 in Figure 3) can be anywhere within the available wavelength range (λA to λB).

As disclosed by the AAPA, for a conventional system, each time a new remote apparatus is installed, a wavelength to be used in that system must be set by a maintainer or other personnel. And collisions between signals may occur and action must be taken to handle them.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the method and system of autonomously controlling and setting of an available wavelength or unused wavelength as taught by Majima and Nakamura et al to the system of the applicant admitted prior art so that the controller can get the reception status information from the receiver, and then desired wavelength for reception and transmitting can be easily and automatically selected based on the received information, and then no man-hours are required while a new remote apparatus is added or updated.

Nakamura et al teaches that the first wavelength λ1 can be selected for transmission. But, Nakamura et al does not expressly disclose that the sweep is stop once the first unused wavelength is found.

Another prior art, Smith, teaches a scheme to find the available wavelength (e.g., Figure 8A), during the steps of searching (e.g., the loop 93->94->95->96->93 shown in Figure 8A), once the available wavelength is found (step 94), the searching is stop, and the path is set; if the available wavelength is not found (step 94), the system will generate a new control signal to search again (e.g., "flag regen path" and "next regen path" in Figure 8A) until the system determines that the available wavelength is found.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the scheme of wavelength searching as taught by Smith to the system of the AAPA and Majima and Nakamura et al so that once the unused wavelength is found, the searching is stopped and then setting the separated wavelength as the wavelength to be used in the remote apparatus, but if it is determined that a signal corresponding to the separated wavelength is being received, then generating a new wavelength control signal to control the wavelength separating device to separate a different wavelength from the given plurality of wavelengths until the wavelength control device determines that no signal corresponding to the separated wavelength is being received. The suggestion/motivation for doing so would have been to further reduce the processing time while adding the new apparatus since once the first unused wavelength is found the system uses this wavelength for communication and the sweeping of all wavelength range is not required.

7). With regard to claim 27, the AAPA and Majima and Nakamura et al and Smith disclose all of the subject matter as applied to claims 26 above. And the combination of the AAPA and Majima and Nakamura et al and Smith further discloses the step of:

outputting a signal from a remote apparatus transmitter (e.g., AAPA: the optical transmitter 230-i; or Majima: the tunable LD in Figure 5) at the separated wavelength set as the wavelength to be used by said remote apparatus in said controlling step apparatus (e.g., AAPA: page 3 line 6-11, remote apparatus transmitter 230-m, in response to the control signal, outputting a signal at the separated wavelength set as the wavelength to be used by the remote apparatus; or Majima: the tunable LD, in response to the control signal, outputting a signal at the separated wavelength set as the wavelength to be used by the remote apparatus).

Allowable Subject Matter

6. Claim 20 is allowed.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Monday-Friday, 8:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. L./
Examiner, Art Unit 2613
August 11, 2009

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613